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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/677,850

10/02/2003

Jeffrey Raynor

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04/01/2008

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EXAMINER

SINES, BRIAN J

ART UNIT

PAPER NUMBER

1797

NOTIFICATION DATE

DELIVERY MODE

04/01/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

creganoa@addmg.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/677,850	<b>Applicant(s)</b> RAYNOR ET AL.	
	<b>Examiner</b> Brian J. Sines	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 1/18/2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 39-41, 43-58 and 60-65 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 39-41, 43-58 and 60-65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 39 – 41, 43 – 58 and 60 – 65 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Amended claims 39 and 57 contain new matter that is not supported by the specification. The recited sensor comprising an “integrated circuit die” is not supported by the specification.

### ***Response to Arguments***

Applicant's arguments with respect to the present claims have been considered but are moot in view of the new ground(s) of rejection. Regarding the newly amended portion of the independent claims specifying that the sensor is attached to the mounting substrate in a “flip-chip arrangement,” the applicant’s specification defines a flip-chip arrangement as “a chip [that] is bump bonded face down with a substrate.” (see paragraph 11). As shown in the rejection below the sensor chip 32 is positioned face down with respect to the substrate 36 and can facilitate the proper device connections as recited in the claims (see figure 2). As discussed in the rejection below, the references to Bauer and Casson are merely being used to teach additional exemplary aspects of the attachment method pertaining to the use of bump bonding to facilitate the

Art Unit: 1797

attachment and assembly of the disclosed device. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). As shown in figure 2 of Venkat, it would have been obvious to a person of ordinary skill in the art that the device components comprising the sensor and the mounting substrate would have to be aligned properly during attachment in order for the device to be assembled in the proper manner. Therefore, the cited prior art teach the "flip-chip arrangement" as recited in the claims.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

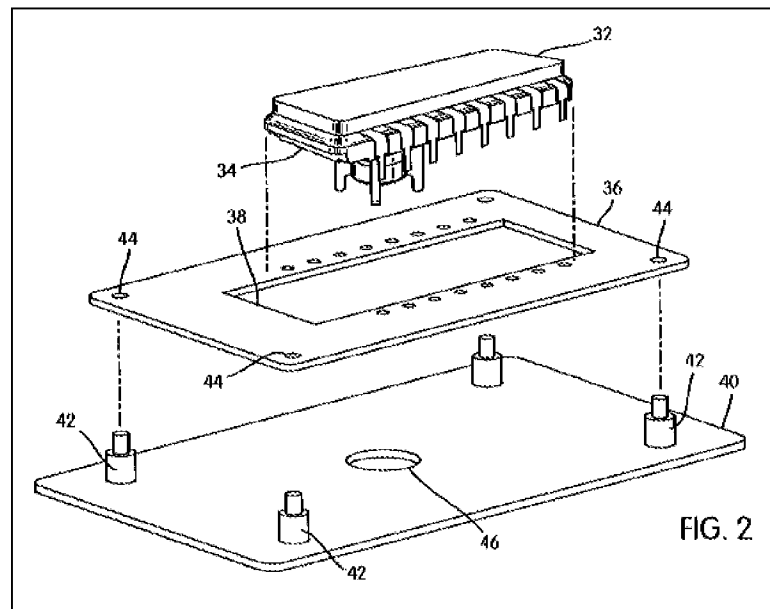
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

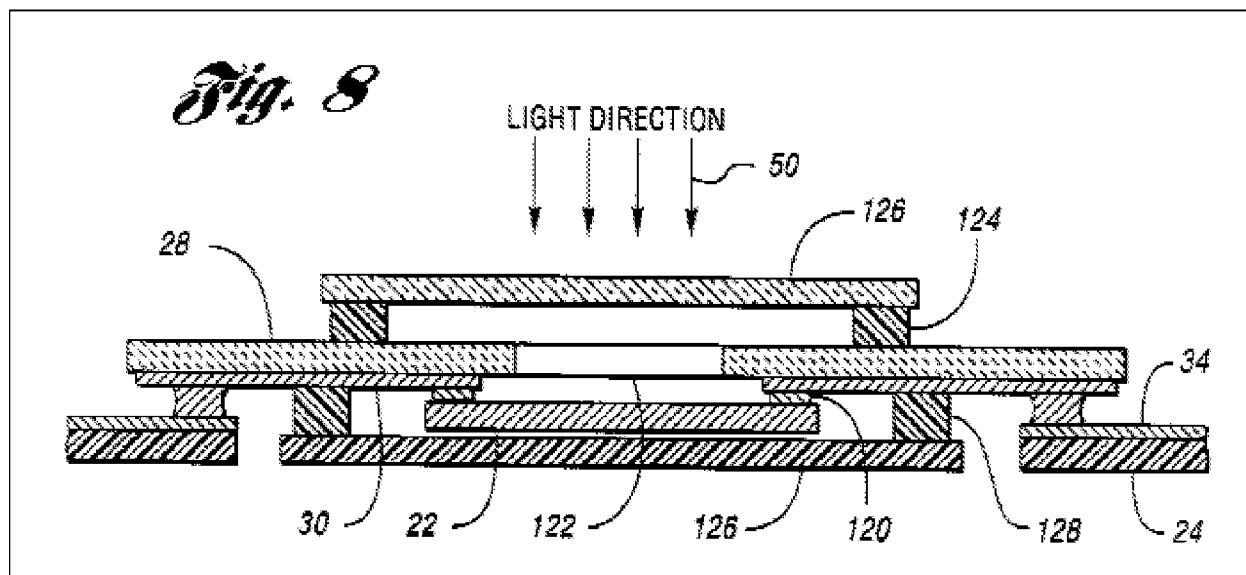
1. Claims 39 – 41, 43, 44, 46, 48 – 54, 57, 58, 60, 61 and 63 – 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkat et al. (U.S. Pat. No. 6,462,330 B1) (hereinafter “Venkat”) in view of Bauer et al. (U.S. Pat. No. 6,130,448 A) (hereinafter “Bauer”) and Casson et al. (U.S. Pat. No. 5,349,500 A) (hereinafter “Casson”).

Regarding claims 39 – 41, 46, 48 – 50, 52, 53, 57 and 58, Venkat teaches a method for attaching a sensor (optical sensor IC 32 with an integrated aperture plate 34) comprising a sensing face, a sensor or image sensing area (e.g., lens 56), signal output contacts and a housing (base plate 40) comprising an extended formation (alignment posts 42) to opposite sides of a mounting substrate (printed circuit board (PCB) 36 having additional openings (alignment apertures 44)) having an opening therethrough (38). Venkat teaches that the device components are positioned and aligned during device assembly (see col. 3, lines 1 – 62; figures 2 – 9).



Venkat does not specifically teach the use of bump bonding for facilitating the attachment of the sensor to the mounting substrate.

Bauer does teach the use of bump bonding using solder bump 120 in attaching an optical sensor 22 to a mounting base substrate 28 that comprises circuitry (e.g., conductive strip 30) (see, e.g., col. 10, line 61 – col. 11, line 10; col. 12, lines 41 – 59; figure 8). As shown in figure 8, the optical sensor 22 is aligned and mounted on the substrate 28 comprising opening 122.



Furthermore, Casson teaches the attachment of a chip device to a flexible printed circuit board using solder bumps to facilitate a secure electrical connection (see, e.g., Abstract). Casson teaches the self-alignment of the chip device to the mounting substrate comprising a flexible printed circuit board using a solder bump bonding methodology that also comprises a heating step (see, e.g., col. 16, lines 52 – 68).

The applicant is advised that the Supreme Court recently clarified that a claim can be proved obvious merely by showing that the combination of known elements was obvious to try. In this regard, the Supreme Court explained that, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has a good reason to pursue the known options within his or her technical grasp.” An obviousness determination is not the result of a rigid formula disassociated from the consideration of the facts of the case. Indeed, the common sense of those skilled in the art demonstrates why some combinations would have been obvious where others would not. “The combination of familiar elements is likely to be obvious when it does no more than yield

Art Unit: 1797

predictable results.” See *KSR Int’l v. Teleflex Inc.*, 127 Sup. Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007). In this regard, the use of bump bonding as disclosed by the prior art would have provided a predictable and suitable result in facilitating the attachment of the sensor to the mounting substrate. Furthermore, as indicated by Bauer and Casson, a person of ordinary would accordingly have had a reasonable expectation for success in using bump bonding in facilitating the aligned attachment of the components of the disclosed sensor device. The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success (see MPEP § 2143.02). Therefore, it would have been obvious to a person of ordinary skill in the art to use bump bonding with the disclosed methodology as claimed to facilitate effective and secure alignment and attachment of the components of the device.

The recited landing feature adjacent an opening is interpreted as being merely the surface area around the opening to which the bump bond is bonded to facilitate the alignment and attachment of the mounting substrate and housing of the disclosed device.

Regarding claims 43 and 60, it would have been obvious to a person of ordinary skill in the art to incorporate a plurality of duplicate bump bonds around the perimeter of the opening in order to provide for a secure alignment and attachment of the optical sensor and mounting substrate. The mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art (see MPEP § 2144.04).

Regarding claims 44 and 61, Bauer teaches that the optical sensor 22 is aligned to base substrate 28, 140 and all solder joints are made simultaneously by reflowing solder bump 120 (see col. 12, lines 40 – 51). Casson also teaches the self-alignment of the chip device to the



mounting substrate comprising a flexible printed circuit board using a solder bump bonding methodology that also comprises a heating step (see, e.g., col. 16, lines 52 – 68). Therefore, it would have been obvious to a person of ordinary skill in the art to heat the bump bonds so that the sensor would become aligned and then subsequently fixed with the mounting substrate.

Regarding claim 51, the incorporation of additional projections (e.g., 42) with the housing 40 and additional corresponding openings (e.g., 44) with the mounting substrate 36 to facilitate the mating of these two structural components to form an assembled sensor device would have been obvious to a person of ordinary skill in the art. The mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art (see MPEP § 2144.04).

Regarding claim 54, the use of threaded connections are well known in the art. Therefore, it would have been obvious to a person of ordinary skill in the art to employ the use of threaded connections during the assembly of the disclosed device as claimed.

2. Claims 45 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkat, Bauer and Casson in view of Glenn (U.S. Pat. No. 5,949,655 A) (hereinafter “Glenn”).

Regarding claim 45 and 62, Venkat and Bauer do not specifically teach the incorporation of a CCD device. Glenn further teaches a sensor device comprising a charge coupled device (CCD) incorporated with an integrated circuit (see, e.g., col. 1, lines 39 – 55). A charge coupled device is considered functionally equivalent to the optical sensing device that is incorporated with the device disclosed by Venkat (see MPEP § 2144.06). The Courts have held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such a substitution obvious. See *In re Fout*, 675 F.2d 297, 213 USPQ 532

(CCPA 1982). Thus, it would have been obvious to a person of ordinary skill in the art to incorporate a CCD device with the device disclosed by Venkat and Bauer.

3. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Venkat, Bauer and Casson in view of Bidiville et al. (U.S. Pat. No. 5,854,482 A) (hereinafter “Bidiville”).

Regarding claim 47, Venkat and Bauer do not specifically teach the use of a photodiode array. Bidiville does teach a device using an optical sensing system incorporating the use of a photodiode array (see col. 9, lines 9 – 34). A photodiode array is considered functionally equivalent to the optical sensing device that is incorporated with the device disclosed by Venkat (see MPEP § 2144.06). The Courts have held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such a substitution obvious. See *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). Thus, it would have been obvious to a person of ordinary skill in the art to incorporate a photodiode array system with the device as claimed.

4. Claims 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkat, Bauer and Casson in view of Groger et al. (U.S. Pat. No. 6,300,638 B1) (hereinafter “Groger”).

Regarding claims 55 and 56, Groger teaches a biological sensing system incorporating the use of an optical sensor (e.g., photodiode/amplifier package 23) with a matter delivery system (e.g., inlet 36, outlet 38 and cavity 34) (see figures 1 and 4). The photodiode optical sensing system is considered functionally equivalent to the optical sensing device that is incorporated with the device disclosed by Venkat (see MPEP § 2144.06). The Courts have held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such a substitution obvious. See *In re Fout*, 675 F.2d 297, 213 USPQ 532

(CCPA 1982). Thus, it would have been obvious to a person of ordinary skill in the art to incorporate the optical detection system with the disclosed device as claimed.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines, whose telephone number is (571) 272-1263. The examiner can normally be reached on Monday - Friday (11 AM - 8 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1797

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brian J. Sines  
Primary Examiner  
Art Unit 1797

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